HEWLETT PACKARD

VISUALIZE Workstations
NT & HP-UX Functional Interoperability

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HP VISUALIZE
WORKSTATIONS

Introduction

Windows NT has much of the functionality of HP-UX. This similarity exists at many levels, from an integrated, secure GUI user interface environment to coexistence of the two Operating Systems (OSs) at various levels of interoperability and integration. For instance, the interoperability of HP-UX and NT allows these two operating systems to mutually participate in printing and several different forms of file and application sharing. This is because both HP-UX (using add-on software for non-IP protocols) and NT can communicate using TCP/IP, NetBEUI and NWLink network transport protocols. Using these protocols, network integration is available between the two OSs that allow users to interact with each other without being concerned with their connections to the network.

In concept, the system administration tasks and capability of NT closely parallel that of UNIX. Although, NT's terminology and security methodology today differ from those familiar to HP-UX System Administrators, there are many tools, such as OpenView from HP, that allow an administrator to manage and monitor both HP-UX and NT systems using a consistent interface. These types of tools allow bi-directional system management using either an HP-UX or NT desktop. Similarly, at the system level, tools such as the HP-UX System Administration Manager (SAM) are also starting to appear on high-end PCs. One particularly good example is the "TopTools" suite now bundled with HP's Kayak PC workstations.

A consistent truth concerning the two OS's has been found: NT is no different than HP-UX with regards to planning. The same kind of problems that are faced with planning network infrastructure, user accounts and security, system administration, and the like on HP-UX are faced on NT. It's just the final implementation in many of the functional areas are considered by some to be easier in NT than UNIX due to NT's use of the Windows 95 GUI. Similarly, the applications and operating system on the NT side can appear more seamless for the end user due in part to the integration of a GUI technology with the core NT operating system. The challenge in a mixed environment of Windows NT and UNIX desktops is to allow for the integration of resources, applications and files from both platforms.

However, from the viewpoint of a technical HP-UX workstation user and system manager, there are only a few areas of functionality in the technical high end, that are currently lacking in a Windows NT desktop environment today.

Interoperability & Integration
File Sharing

Functional interoperability exists between HP-UX and NT at many levels, from the most fundamental network media, such as 10BaseT, to application sharing. File sharing, one of the most intuitive interoperability areas, is a good example.

The most basic form of file sharing is the ability to move a MSDOS (FAT or File Allocation Table) formatted floppy disk from an NT system to a HP-UX system. To do this, remember that a DOS text file should be converted to/from a HP-UX file by using the *ux2dos* and *dos2ux* utilities (commands to handle carriage returns and line feeds, etc.). If

this is not done, text files can become unreadable by the host system editor. However, more sophisticated methods are available.

Moving up to the next level, the underlying network file system for NT is based on SMB (System Message Block), whereas the file system for the HP-UX network is NFS (Network File System). This discontinuity does not present a problem however, since there are many alternative software packages available to transfer files over a mixed network of UNIX and Windows NT systems.

The least obtrusive of these alternatives is the utilization of the ftp (File Transfer Protocol) and rcp (Remote file CoPy) commands that are already familiar to UNIX users. These utilities use their own protocol and thus don't use either SMB or NFS. Of course ftp and rcp are standard on HP-UX as both client and server. NT 4.0 has available both ftp and rcp clients and an ftp service.

In addition, add-on utilities are available to allow HP-UX to access NT networked files and NT to access HP-UX networked files. For instance, Advanced Server for UNIX (licensed and sold by HP as Advanced Server/9000) allows HP-UX files and directories to be accessed from an SMB based file system. Advanced Server includes other features, such as security authentication, etc., which also help with system management and interoperability. Other options include SAMBA, a freeware program, which allows access to HP-UX resident data from an SMB based system. VisionFS is another SMB to NFS gateway type product that runs on HP-UX.

NFS software, standard for UNIX environments, is packaged with HP-UX, but is not natively available on NT. However, there are many vendors, such as Hummingbird Communications Ltd. and Intergraph, that provide both NFS client and server software packages for Windows NT allowing file access through this standard UNIX mechanism. In addition to NFS, HP also offers the Distributed File System (DFS). DFS is available for both HP-UX and NT and offers enterprise-wide file system access capabilities beyond those of traditional NFS.

Although the above solutions support file transfer in a heterogeneous environment, this does not necessarily mean that data in the file is interoperable with a given application on either platform. The architecture of HP PA-RISC and HP-UX uses a byte ordering known as big endian architecture, while Intel with Windows NT uses little endian architecture. This can be addressed at the HP-UX application code level by using the "swab" routine to adjust the byte ordering of the data.

Printing

Printing functionality is comparable between HP-UX and Windows NT. NT comes standard with the means to access an HP-UX print spooler by utilizing both the remote line printer (rlp) command on the NT system and line printer daemon (lpd) on the HP-UX system. NT also comes with print monitors (similar to a print spooler daemon in HP-UX) for other print spooler hosts. Finally, the NT system has a print monitor for Data Link Control (DLC) protocol, which allows access to printers directly connected to the network.

From the HP-UX workstation side, printers spooled from a Windows NT system can be accessed via the rlp command on HP-UX. Windows NT has the lpd service (LPDSVC) available to allow HP-UX clients to print through NT. However, there is one note of

caution: be sure the rlp command has the *Berkley* switch options set, to print postscript files from HP-UX through NT.

Terminal and Application Access

There are many software packages that allow terminal access or application display to/from HP-UX and Windows NT.

For terminal access, HP-UX provides telnet and rlogin/remsh/rexec clients as well as telnetd and rlogind daemons to allow multi-user access. NT on the other hand, only provides telnet, rsh (similar to remsh in HP-UX) and rexec clients. With add-on NT software packages, like OpenNT that provide a telnet daemon service, NT can become a multi-user system in the traditional UNIX sense.

Windows NT does not support X11 Windows, Motif or CDE (Common Desktop Environment) natively, as does HP-UX. Vendors outside of Microsoft provide software, which enable NT to be both client and server within X windows. Packages such as OpenNT, Reflection X and WinTED, provide X11 services such that an NT desktop user can open an X terminal or X Window application from a HP-UX system and display it on their desktop.

Running Windows NT 4.0 applications and interacting with them on an HP-UX workstation X11 desktop can also be accomplished with the use of alternative packages. These software packages, such as WinCenter and TealView, provide a mechanism for trapping the Microsoft Windows display calls and sending them via X11 to the remote HP-UX system. This allows an HP-UX workstation user to run Windows NT applications in an X Window within the CDE or VUE environments. This access to a Windows NT 4.0 server and its applications is based upon Microsoft Windows NT 4.0 Server, Terminal Server Edition and MetaFrame from Citrix.

Although DCE (Distributed Computing Environment) is implemented on both operating systems, HP-UX has a full tool and feature set. Microsoft has currently incorporated only the remote procedure call (rpc) portion of the OSF (Open Software Foundation) specification for DCE. Although it is not a full feature set, it does some basic application interoperation between HP-UX and NT.

Table 1 : Native Functionality for HP-UX/NT Interoperability

	HP-UX	Windows NT (Rev. 4.0)
File System (networking)	NFS	SMB
File System (enterprise/distributed)	DFS	DFS (compatible with NT DFS only)
File System (disk)	HFS, VxFS, LIF	NTFS, FAT
File System (miscellaneous)	FAT	FAT
File System (CD-ROM)	CDFS	CDFS
Network Transport	TCP/IP	TCP/IP, NetBEUI, NWLink
Network Addressing	DHCP, DNS	DHCP, DNS, WINS
Remote File Copy Clients	ftp, rcp	ftp, rcp
Remote File Copy Services	ftpd rcpd	ftpd
Remote Application Communication	DCE, rexec, remsh	DCE (rpc only), rexec, rsh
Remote Printing (client/server)	rlp/lpd, DLC	rlp/lpd, DLC
Remote Terminal Clients	telnet, rlogin, X windows	telnet
Remote Terminal Servers	Telnetd, rlogind, X windows	Telnetd available in Resource Kit
Remote Application Display	X windows	
Window Environment	X11 windows (CDE or VUE)	WIN32

Summary

Windows NT makes an appropriate desktop when the required applications are available or perhaps, if the GUI on NT is more productive for a particular engineer. An HP-UX workstation, on the other hand, is appropriate if the engineer utilizes very complex Computer Aided Design and Analysis tools for extremely large data sets or relies on absolutely critical availability or even fast process I/O performance. Whether NT or HP-UX is chosen, the same administration processes and functions must be maintained (e.g. user accounts, print spooling, etc.). Network infrastructure must also be expanded and re-evaluated or perhaps re-designed, as new workstations are added and/or changed. In addition, careful thought must be given to whether an interoperable and enterprise extensible file system is to be based on a UNIX-centric approach (i.e. DFS), or an NT centric approach (i.e. SMB).